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4.15 Test of the Movement of a Dissolved Mineral Front

This test verifies that FEHM has correctly implemented the reactive transport system consisting of one-dimensional transport with the movement of a dissolved mineral front. Figure 57 compares the front location and shape simulated using FEHM to that predicted from the analytical solution. The results agree closely, with FEHM's numerical results exhibiting a very slight spreading of the dissolution front. Nonetheless, the position of the front agrees with the predicted value (found in files *dissolution.analyt2*, *dissolution.analyt3*, and *dissolution.analyt4*) to within a maximum error of 3.9%. This error is less than 5%, and these results meet the acceptance criteria for this test suite developed in Chapter III. It should be noted for this problem that the RMS error is a single point average for each time.

Table 57. Results of a test of the movement of a dissolved mineral front

V&V test	Maximum error	Maximum % error	RMS error
Dissolution front versus time			
Time 20000. s	0.2606e-02	3.889	0.3889e-01
Time 60000. s	0.3516e-02	1.749	0.1749e-01
Time 100000. s	0.7230e-03	0.2158	0.2158e-02

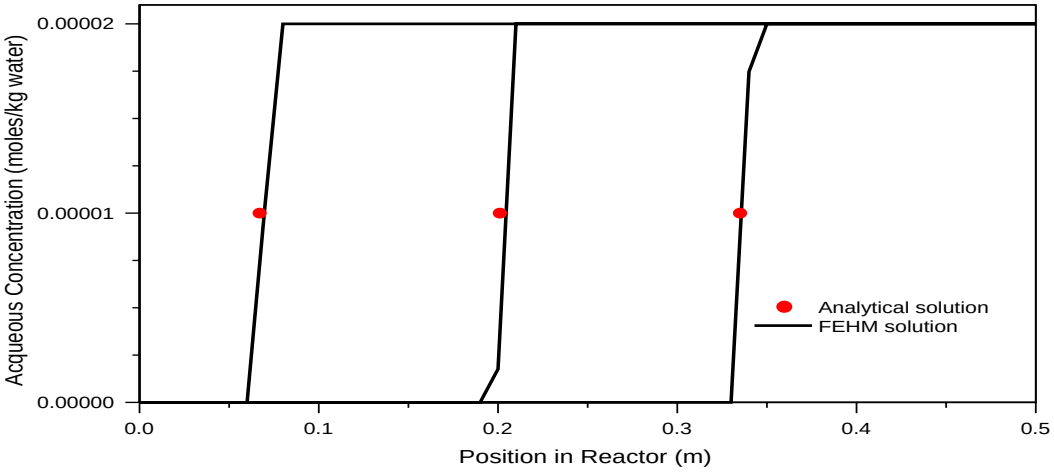

Figure 57. Comparison of FEHM and the analytical solution for the position of the dissolved mineral front at the final time of the simulation.